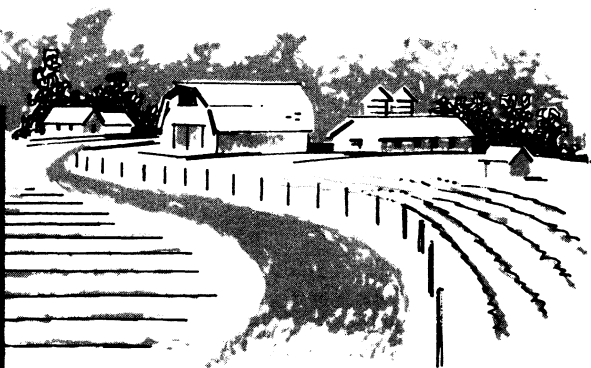


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Ag 847  
Farm. Bul. 2107 Dec. 1964  
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# DEFENSE AGAINST RADIOACTIVE FALLOUT ON THE FARM

FARMERS' BULLETIN NO. 2107  
U. S. DEPARTMENT OF AGRICULTURE



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## PROTECT YOURSELF AND FAMILY FIRST

If we were attacked with nuclear weapons, you, the American farmer, would be depended on to supply the food and fiber needed to keep the economy going. One of the problems you might face is radioactive fallout.

*In the event of enemy attack, first provide for your own safety and that of your family and neighbors. Then take care of your livestock, your crops, and your land.*

Your best protection from fallout is a specially constructed shelter or a protection area in an existing building. If fallout occurs and you have not yet built a shelter, go to the safest place you have—such as a cyclone cellar, a root cellar, or a corner of your basement.

To increase the protection of your basement, shield doors, windows, and other openings with dense materials such as concrete blocks, bricks, or sandbags. If your basement is below ground level, you may increase its protection value by covering the floor above it with a foot or more of sandbags or loose soil. If you do not have an underground refuge, at least *stay indoors*.

Designs of five different types of inexpensive family fallout shelters—one of them a “do-it-yourself” type—are presented in a publication on family fallout shelters, available from your local civil defense office, or by mail from “Box Home Shelter,” Battle Creek, Mich.

Local civil defense authorities will make every effort to let you know when it is safe to come out of shelter. Emergency information will be disseminated to the public in every possible way, including radio and television.

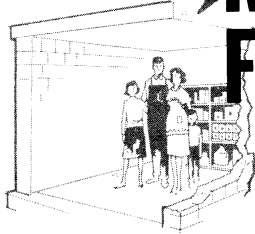
*The recommendations in this bulletin are those of scientists, engineers, public health officials, civil defense authorities, and other specialists. Study of the effect of radioactive fallout on agriculture is a continuing project. Some of the recommendations in this bulletin may have to be changed in the light of future research.*

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## CONTENTS

	Page
Background information.....	3
Protecting livestock.....	8
Protecting land and crops.....	14
Emergency defense services.....	19
More pointers on protection.....	22

# DEFENSE AGAINST RADIOACTIVE FALLOUT ON THE FARM



## *Background Information*

Most Americans know about the destructive power of nuclear weapons. The explosive power of the atomic bombs used in World War II was equivalent to about 20,000 tons of TNT. Since then, bombs have been developed that have explosive power equivalent to millions of tons of TNT.

An enemy attack with a nuclear weapon could cause radioactive contamination many miles downwind from the target area. Radioactive material produced by the bomb would give off destructive rays or particles which could injure—or kill—human beings and animals, and could make farmlands and crops dangerous to use. This material, when it falls to the earth, is called radioactive fallout.

Fallout could settle anywhere—even in the most remote parts of the country. If large industrial centers

or missile sites were bombed with nuclear weapons, it is likely that small towns and rural areas in the downwind path would be endangered.

If a massive nuclear attack were to occur, a high percentage of our farmland would receive *early* fallout. Every part of the country would receive varying amounts of *delayed* fallout. Early fallout consists of heavy particles that are deposited within 24 hours after a nuclear explosion, and usually within a few hundred miles from the point of explosion; the extent of its spread depends on the winds. Delayed fallout consists of the smaller particles that remain suspended in the atmosphere for periods of months or even years, and are carried by the winds to all parts of the earth.

Fallout, if significant, would be visible, especially on polished or

smooth surfaces, but the radiation from its active elements could be detected accurately only by special instruments. Because of this, your government is preparing means of warning you—through regular and emergency channels—if your land and home lie within the path of harmful radioactive contamination.

There is a defense against fallout—on the farm and in the home. The following questions and answers will help you to understand the nature of fallout, and, in the event of enemy attack, will help you to protect yourself from it.

### **What is radioactivity?**

It is a process whereby radioactive elements disintegrate and, in so doing, release powerful electromagnetic rays like X-rays, or eject very small, invisible particles of matter.

Radioactivity is nothing new. All living things are constantly exposed to small amounts of radiation. Cosmic rays from space continually pass through our bodies. We breathe and eat radioactive materials that occur naturally in the soil, water and air. We also are exposed to radiation when we have X-ray

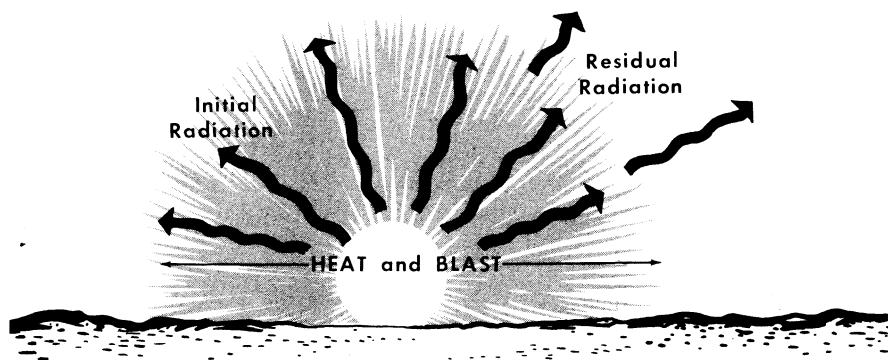
examinations. But explosions of nuclear bombs produce large amounts of radioactive elements that can affect the health of human beings and animals.

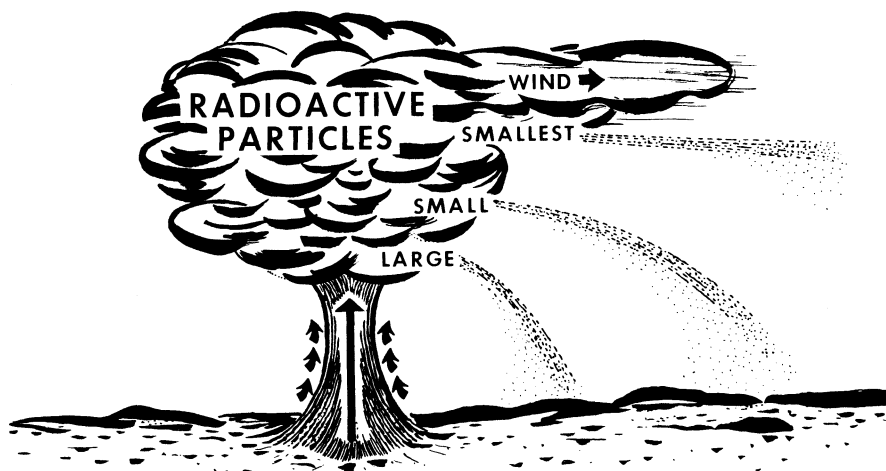
### **What happens when a nuclear bomb explodes?**

The explosion of an atomic or hydrogen bomb is accompanied by *blast, heat, initial radiation, and residual radiation*. The first three occur almost instantaneously with the explosion, and are destructive in the target area and for some miles around. The fourth—residual radiation, which comes mostly from fallout—has a delayed and longer effect, and may be dangerous over a considerably larger area.

### **What is fallout?**

Fallout is the term used to describe radioactive material produced by a nuclear explosion; this material falls to earth from the upper air. When a bomb explodes *close to the earth*, large quantities of pulverized soil are drawn up into the ascending cloud and may be carried to heights of 15 miles or more. After mixing with the highly radioactive residue material of the bomb, the finely divided soil falls back to





earth and produces radioactive contamination.

The coarse particles of this material fall close to the point of the explosion. The smaller particles fall more slowly, and the winds carry them farther as they descend. It takes at least half an hour after an explosion for significant amounts of fallout to arrive outside the blast area. Fallout of major concern will have been deposited within 1 day after the explosion and, depending upon the winds, may extend several hundred miles downwind. It may eventually blanket thousands of square miles if the bomb was large and the winds are strong.

#### ***Why is fallout dangerous?***

If an area is highly contaminated by fallout, the radiation may be a threat to human beings, animals, and crops. Fallout can also contaminate food, water, buildings, yards, and fields, and make them unsafe to use for varying periods of time.

Some of the rays can penetrate the body and cause serious internal

damage. Others are not capable of deep penetration, but can burn the skin if they are deposited in significant amounts and left to remain on the skin. All radioactive chemical elements in fallout, including radioactive strontium and radioactive iodine, can cause internal radiation damage if taken into the body in sufficiently large quantities.

To understand the nature of fallout, it is necessary to know that fallout contains a mixture of long-lived and short-lived radioactive materials, each of which loses activity, or decays, at a specific rate. Scientists usually express the decay rate in terms of the half-life of the material. The half-life is the time required for one-half of the radioactivity of a material to be given off.

Radioactive strontium is among the most important of the long-lived group. Radioactive iodine is an example of an important, relatively short-lived substance.

Chemically, strontium is similar to calcium. For example, after it enters the body of a dairy cow, a

small part is secreted in milk, a small part goes into the muscles, and a part collects in the bones. Radioactive strontium has a half-life of about 28 years—it continues to lose one-half of its remaining radioactivity during each 28-year period that passes—and sufficient amounts of it in the body may cause bone cancer, and can damage tissue.

Radioactive iodine has a half-life of about 8 days, and therefore is dangerous for a much shorter time than radioactive strontium. After radioactive iodine enters the body, about 20 percent of it collects in the thyroid gland. If too much of it is present in the body, particularly of a young person, it may seriously damage the thyroid cells. It is secreted in the milk of cattle, thus becoming a threat, especially to children drinking milk from *grazing cows* during the first few weeks following a nuclear attack.

#### **What determines the size of the fallout area?**

Fallout can be a serious hazard to communities that are many miles beyond the areas affected by the explosion. During a 1954 test at the Eniwetok Proving Grounds in the Pacific, the area of heavy fallout extended about 140 miles downwind from the point of explosion, and was up to 20 miles wide.

The extent and location of a fallout area are determined by—

1. Altitude of the bomb burst.
2. Power and design of the bomb.
3. Size of the fallout particles.
4. Atmospheric conditions—including precipitation and direction and speed of winds from the surface up to about 80,000 feet.

Because of the variety of factors, it is not possible to estimate accurately the fallout hazard in advance. However, the area of probable fallout and the speed with which fallout will arrive can be estimated. Data for preparing these forecasts are released twice daily by the U.S. Weather Bureau on a routine basis and are available to civil defense authorities.

After a bomb is exploded close to the ground, a large radioactive cloud rises to a high level in the atmosphere. Some of the pulverized soil particles are blown downwind and crosswind, in the area of the target. Strong winds may spread fallout over long distances downwind.

Raindrops and snowflakes collect fallout if they form in contaminated air or pass through it. The return of radioactive material from extremely high altitudes is rather slow; the material is carried to earth principally by snow and rain descending into the lower altitudes. This can cause the rate of deposit to be irregular. In the absence of precipitation, the rate of deposit would tend to be more uniform.

#### **How long is fallout dangerous?**

The greatest hazard from radiation exists during the first few days following heavy deposit of fallout. The hazard decreases with the passage of time, as radioactive materials decay and the intensity of radiation decreases.

The particles reaching the ground soon after the burst are highly radioactive, while those that remain in the air for longer periods lose much of their radioactivity by decay before they settle to earth.

The total radiation hazard of newly formed (fresh) fallout decreases rapidly at first because this fallout contains many radioisotopes that have short half-lives. The radiation hazard decreases less rapidly after the shorter-lived elements have lost most of their radioactivity.

Twenty-four hours after an explosion the average per-hour rate of radiation coming from fallout is about 2 percent of the rate 1 hour after the explosion. But even this amount of radiation can be dangerous if fallout is heavy.

#### ***How can I protect my family and myself from radiation?***

You can limit exposure by staying in an adequate shelter. Three or more feet of packed earth or several feet of concrete provide excellent shielding from radiation. An ordinary frame house will give some protection—it will reduce the radiation exposure to about one-half. A

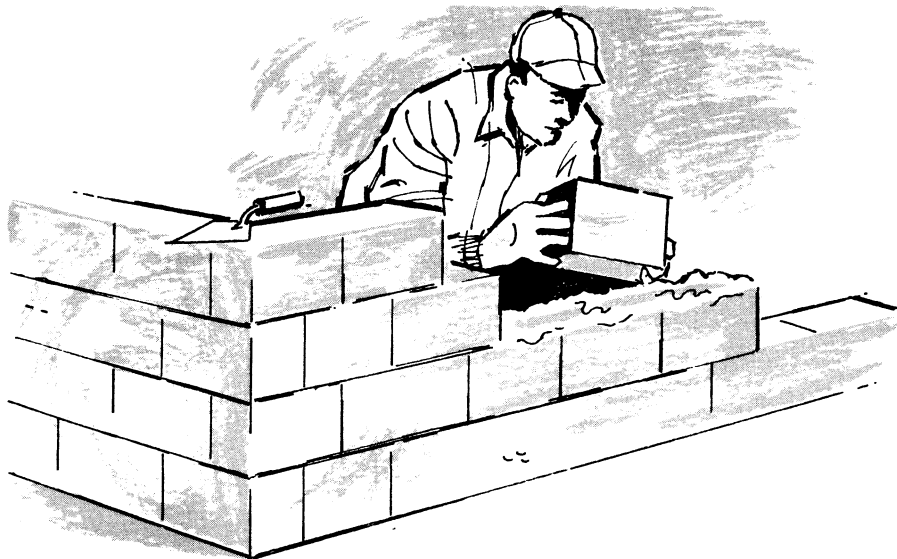
basement below ground level will help to reduce radiation exposure to about one-tenth.

If time and conditions permit, local civil defense authorities may call for evacuation to safer areas.

#### ***How will I know if fallout is coming?***

Certain radio stations have been authorized to operate and make emergency broadcasts during a national emergency. If an enemy attacks, these stations will broadcast official information and instructions. Local or county civil defense officials can tell you what stations in your area have been authorized to make emergency broadcasts. If you are not within range of a station authorized to make such broadcasts, follow whatever pre-attack instructions you have received from your local, county, or State officials.

Later, you will receive information based on the findings of local civil defense radiological monitors, who will conduct surveys in the





areas involved. The monitors will measure radiation from the fallout with suitable instruments to determine what further precautions, if any, should be taken. (See pp. 20, 21 for facts about the USDA monitoring service.)

Radiation can be detected and

measured only with proper instruments. However, after nuclear attack, dust clouds or unusual dust concentrations in the atmosphere should be assumed to be radioactive unless they are surveyed with instruments and found not to be radioactive.

## *Protecting Livestock*

### ***How will fallout affect unprotected livestock—that is, animals in fields, pastures, and other open areas?***

Fallout may be dangerous to cattle, sheep, horses, pigs, and other livestock as well as to human beings. Radioactive materials in fresh fallout can contaminate the immediate environment and give off rays that can penetrate deep into the body. This is the major source of danger for livestock. Animals can also suffer skin burns if fallout settles in the coat.

An exact value of safety is difficult to set for animals grazing on open range. However, a single brief exposure (within the first 96 hours following detonation) of up to 300 roentgens of total body irradiation may be reasonably tolerated by most farm animals.

When it is necessary to graze livestock on fallout-contaminated pasture, supplemental feeding from noncontaminated forage can materially reduce the daily dose of radioactive material the animals will eat. Stored or stacked hay, ensilage from either silo or trench, and stored grain would provide safe sup-

plemental feeds. When no shelter is available and when the level of radioactivity is only moderate, or the food resources are scant, growers should, if possible, supply supplemental feeding and limit the grazing time.

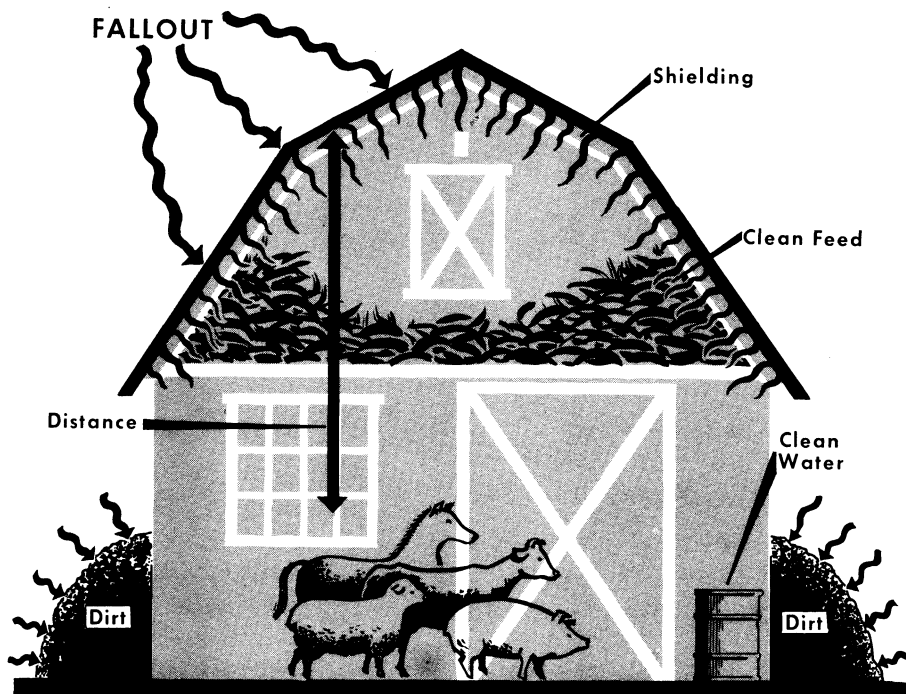
When meat and dairy animals eat contaminated feed, some radioactive elements are absorbed into their bodies. Thus, man's food supply of animal products can become contaminated with radioactivity.

### ***How will fallout affect sheltered livestock?***

Livestock housed in barns and other farm buildings during fallout stand a better chance of surviving the effects of radiation than those that are not sheltered. A reasonably well-built shelter reduces the intensity of external radiation and prevents fallout from settling on the animals' bodies. It also prevents the animals from eating contaminated feed.

### ***What is the best way to protect livestock from fallout?***

Move them indoors as soon as possible. If you do not have adequate facilities to house all the animals, put some of them near farm



buildings or in a small drylot. Large, protected self-feeders and automatic livestock waterers can supply uncontaminated feed and water.

Areas within movable creep fences, and other small fenced areas that have covered or self-feeders, can provide emergency confinement for farm animals after the early external radiation intensity has decreased through decay.

Empty trench silos can be converted to livestock shelters by constructing a roof over the trench or covering it with earth.

Once fallout occurs, you should not attempt to protect livestock unless local civil defense authorities tell you that you will be safe when doing so.

Get your dairy cattle under cover first. (See p. 11.)

#### ***What water can I give livestock after fallout?***

Water from a covered well, tank, or cistern, or from a freely running spring, is best.

River water or pond water is less safe, but if necessary it could be used after fallout has occurred. In a few days it would be safe.

Usually, there would be a prompt settling of fallout particles and diffusion of soluble radioactive materials in the water, reducing the contamination at the surface. If the water were being constantly replenished from an uncontaminated source, radioactivity would be diluted rapidly.

To prevent contamination from fallout, do not add water to covered tanks unless the water is from a properly protected well or spring; first use the water originally present in the tanks.

***Could I use water in an exposed pond?***

Water in an exposed pond would be contaminated, but usually the level of contamination would decrease rapidly. Such water could be used for surface irrigation. It could also be used to wash off farm buildings and unsheltered livestock. Drinking water for livestock should be obtained from another source if possible.

***What feed can I give livestock after fallout?***

To protect feed adequately, cover it. Fallout is like dust or dirt; a cover will prevent it from coming in contact or mixing with the feed.

Grain stored in a permanent bin, hay in a barn, and ensilage in a covered silo are provided with ade-

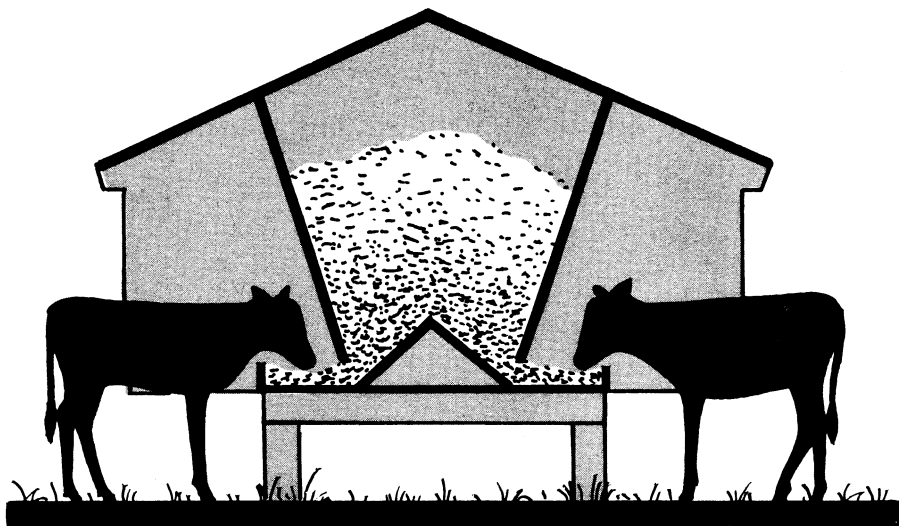
quate protection. They can be used as soon as it is safe to get to them following fallout.

A haystack in an open field can be protected with a tarpaulin or similar covering.

If possible, give your livestock feed that has not been exposed to fallout. If fallout particles settle on hay, silage, or a stack of feedbags, they will contaminate only the outer parts. You can remove the outer layers or bags, and use the inside feed that is unaffected.

Farmers will be notified if local civil defense and agricultural authorities who measure concentrations of fallout consider the forage growing in an area to be harmful. However, this advice might come too late in heavily contaminated areas. As a precautionary measure, it is desirable to house the livestock and not let them graze.

You may have to give cows contaminated feed if no other feed is available. The milk from these cows may not be usable by children:



but when the cows are back on clean feed, the amount of radioactive material in their milk will progressively diminish. Authorities will measure fallout in affected areas and warn farmers when milk is unsafe.

***What can I do with contaminated feed?***

You may be able to feed it to livestock eventually. Because of radioactive decay, contaminated feed may become safe to use after a period of storage. How long feed should be

stored depends on the type and concentration of the radioactive materials. Do not use contaminated feed that has been set aside until told by authorities that it is safe to do so; then be sure to follow the precautions they may recommend.

***Should dairy cows receive special treatment?***

Yes. Because radioactive materials can accumulate in milk, which will be a critical product during an emergency, you should make a special effort to protect cows from fall-



out. Remove milking cows from a pasturage-feeding system and place them on stored feed rations during the period of fresh fallout and for several weeks. Thus you will prevent iodine 131 from occurring in the milk, or it will be reduced to insignificant levels.

Give cows preferred shelter and clean feed and water. If you can, milk them before fallout occurs; you may not be able to do so for several days afterward. Reduce amounts of water and concentrated feed to maintenance levels.

Construction plans are available through State extension agricultural engineers for a combination dairy barn and family fallout shelter. Although construction of this type is costly, such a facility might be considered for the protection of highly valued breeding stock.

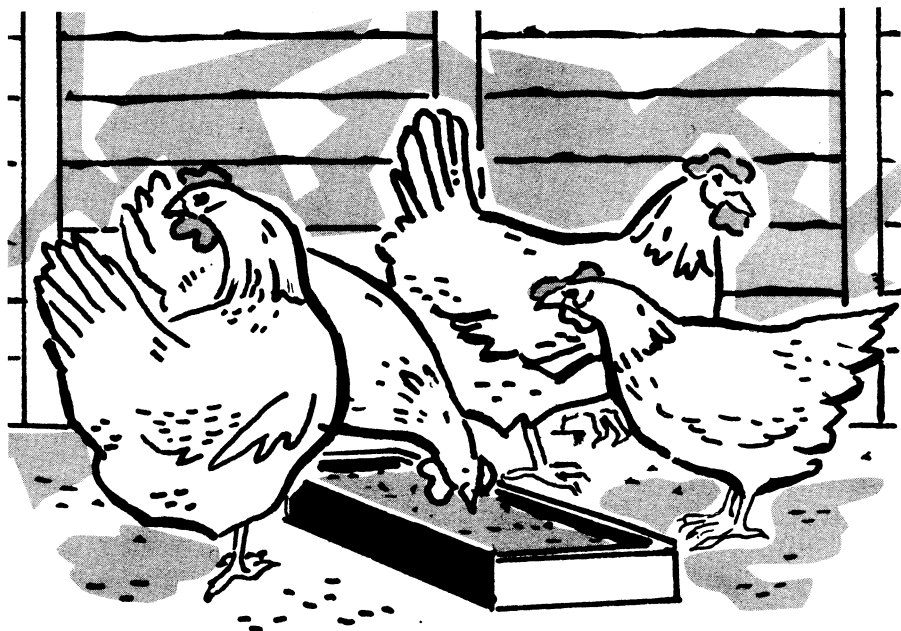
The plans are designed in accordance with milk production ordi-

nances. They provide for (1) a year-round production unit that requires minimum change for emergency use, (2) a built-in family fallout protection area that allows the operator to care for animals during a fallout emergency, (3) all stored feed that is manually accessible to be inside the barn, (4) stored hay and straw for use as shielding, (5) temporary housing, feed, and water for other livestock, (6) an auxiliary generator for assuring electric power, and (7) a water supply inside the barn.

#### ***What measures should be taken to protect poultry?***

Measures for protecting poultry are the same as those recommended for other farm animals.

Poultry are somewhat more resistant to radioactivity than other farm animals. Since most poultry are reared under shelter and given



feed that has been protected or stored, and since poultry can be grown rapidly, they are one of the more dependable sources of fresh foods of animal origin that may be available following a nuclear attack.

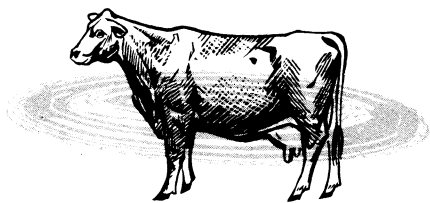
Hens exposed to fresh fallout or contaminated feed or rangeland will produce eggs that contain some radioactive elements. Radioactivity in eggs decreases shortly after the hens are removed from the contaminated environment and given uncontaminated feed and water.

**What animal food products are safe to market after fallout?**

You will receive specific instructions from local civil defense authorities based on the amount of fallout received. *Do not destroy any animal food products unless spoilage has made them inedible.*

Milk should be safe to use if it is from cows that are adequately sheltered and protected and are being fed rations of stored and protected feed and water. Milk from a fallout area where cows are not adequately protected or fed stored feed should not be given to children until approval from civil defense authorities is obtained. Milk contaminated with iodine 131 can be processed into products such as butter, cheese, and powdered or canned milk, and stored for a period of time to allow the radioactivity to decay.

Food animals whose bodies have been exposed to total or partial external irradiation can be safely used for food if they are slaughtered before the onset of symptoms of radiation sickness. Also, they can be



used if they have completely recovered from the ensuing illness. The same rules that govern the slaughter of animals sick from any cause should be followed. Care must be taken to prevent the edible parts of the carcass from being contaminated by radioactive materials contained in the hide, in the entire digestive system, and in the lungs.

**What do I do if animals die from fallout?**

Some of your animals may be affected so severely by radiation from fresh fallout that they will die in a few days or weeks after being exposed. *Do not slaughter any of your livestock unless you are told to do so by local civil defense authorities or USDA county defense boards.* (Functions of the USDA county defense boards are described on pp. 19, 20.)

If animals die from fallout, you can safely bury them. These carcasses usually are not dangerous to surviving people or animals. Special instructions for your protection while handling contaminated carcasses may be issued by authorities if fallout is heavy.

**Is it possible to decontaminate livestock and farm buildings that have been exposed to fallout?**

If there is fallout on the animals' skins, some of the radioactive material can be washed off with water.

Dry brushing is *not* recommended because of possible danger to personnel through inhalation and external contamination.

Civil defense authorities or USDA county defense boards may advise you on decontamination procedures for your farm buildings.

In handling animals, wear coveralls, gloves, and boots to prevent contaminating yourself. Cleaning or disinfecting buildings will not

destroy radioactivity. However, cleaning can be useful in moving radioactive materials to a place where radiation will be less harmful. In cleaning, be careful to avoid contaminating yourself.

**Caution:** Before animals are handled or buildings cleaned, a thorough check should be made of possible radiation hazards to the person performing the task.

## *Protecting Land and Crops*

### **What are the main consequences of heavy concentration of fallout on crop and pasture lands?**

1. Farm workers may not be able to manage and cultivate land safely for some time, because of radiation hazard.

2. It may not be advisable to permit animals to graze, because of the danger of internal and external radiation.

3. Fresh fallout would provide a surface contamination on all plants, resulting in a potential hazard to human beings and animals consuming them.

4. Radiation from fallout deposited on the leaves or the ground may damage the crop.

### **How long would fallout affect cultivated and noncultivated lands?**

It would depend on the abundance and type of radioactive materials in a given area.

In the event of a nuclear attack, radioiodine would be the most critical single factor in the contamination of milk during the first few weeks. After the first 60 days, the

principal hazard of radioactive contamination in milk would arise from strontium 89 and strontium 90. Strontium 89, however, will have virtually disappeared by 1 year after its formation.

Like other radioactive isotopes of fallout, strontium 90 falls on the surface of plants and can be consumed with foods and forage. Some of it is deposited directly on the soil or washed into it, remaining indefinitely—for all practical purposes—in the top several inches of uncultivated land.

Radioactive strontium—a long-lived material—could be present in soils and plants for decades. Because it is chemically similar to calcium, it would be absorbed by all plants. Plants growing in soils deficient in calcium would absorb more radioactive strontium than those growing in soils abundant in calcium, other conditions being equal.

### **Are there soil treatments for reducing the fallout hazard on land?**

Yes, but soil treatments should be given only after responsible au-

thorities had carefully evaluated the situation and declared a state of emergency. The most effective treatment could be costly, and suitable only for intensively used land.

Other methods involve changes in generally accepted farm practices. Some measures could be simply an improvement over local conditions and procedures. For example, the liming of acid soils could reduce the uptake of radioactive strontium in crops grown on those soils.

USDA soil scientists in the USDA county defense boards will provide guidance to farmers in determining the best utilization of their land following a nuclear attack.

It should be emphasized that any use of the land must wait until external radiation levels are low enough for persons to work safely outdoors.

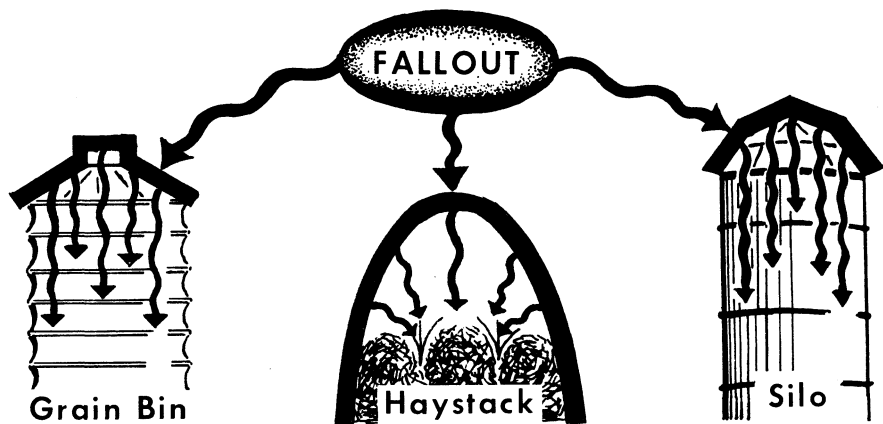
**Would fallout permanently affect pasture grass and forage crops?**

If fallout is extremely light, the pasture would be usable immedi-

ately. It is difficult to set an exact external dose rate at which it would be safe to return the animals to pasture, but at 25 roentgens all animals would survive and could be handled with safety.

If fallout is heavy, the external radiation would prohibit its use. A heavy deposit of fallout would spread short-lived and long-lived radioactive particles on the pasture and forage crops. There might be visible injury to the plants from radiation. Some plants might die.

Existing growths of alfalfa and other forage crops might not be usable because of radiation hazard. If a radiation survey should indicate that the contamination level is high, the existing growth should be removed as close to the ground as possible and discarded; succeeding growths should be used only after examination for radioactivity. If the soil is acid, a top-dressing of lime would help reduce the uptake of radioactive strontium in succeeding growths.



Grain stored in a permanent bin, or ensilage in a covered silo, is provided with adequate protection against fallout. A haystack in an open field may be protected with a tarpaulin or similar covering.





Livestock could be allowed to graze on lightly contaminated pasture after a waiting period that varies from one to a few weeks, the length of time depending on the degree of contamination.

Once it is safe to work the land, a periodic check on pasture and produce in affected areas would provide the best safety guide to their use.

#### **Would fallout affect my system of farming?**

It could. If your land is seriously contaminated, it may be necessary to let it lie fallow for as long as a season. After this, it may require a change to nonfood crops or to food crops that do not absorb large amounts of radioactive materials from the soil. Alfalfa, clover, soybeans, and leafy vegetables have a greater tendency to absorb long-lived radioactive strontium than cereal grains, grasses, corn, potatoes, and fruits. Guidance on suggested crops to plant will come from the USDA county defense boards.

#### **Would fallout reduce the economic productivity of crop and pasture lands?**

Fallout might reduce such productivity in several ways: (1) Crop and soil management could be impeded because of the danger of external radiation; (2) some crops might be killed by the contamination; (3) other crops might become contaminated to a degree where they would be unmarketable; and (4) economic value of food grown on contaminated land might be less than that of other competitive crops.

#### **What are the effects of fallout on growing vegetables?**

Growing vegetables that are exposed to heavy fallout may become highly contaminated. Leaves, pods, and fruits are immediately contaminated upon contact with the radioactive particles. Radiation from heavy fallout may affect plant growth.

Roots and tubers absorb little contamination from fallout before it is mixed with the soil. Underground vegetables that have come in contact with contaminated surface soil during harvest should be washed and tested for radioactivity before marketing. *Many vegetables would be marketable, and none should be destroyed without testing for radioactivity.*

#### **What are the effects of fallout on unripe and ripe fruits?**

If fallout is heavy, ripe fruits may be lost because of the personal hazard involved in harvesting them. Fruits that do not have to be picked immediately and are peeled before

eating can be saved. They can be decontaminated by washing before marketing. Orchard trees should be maintained, and the fruits examined for radioactivity before and after harvest.

***Would fallout limit the use of plants for human food?***

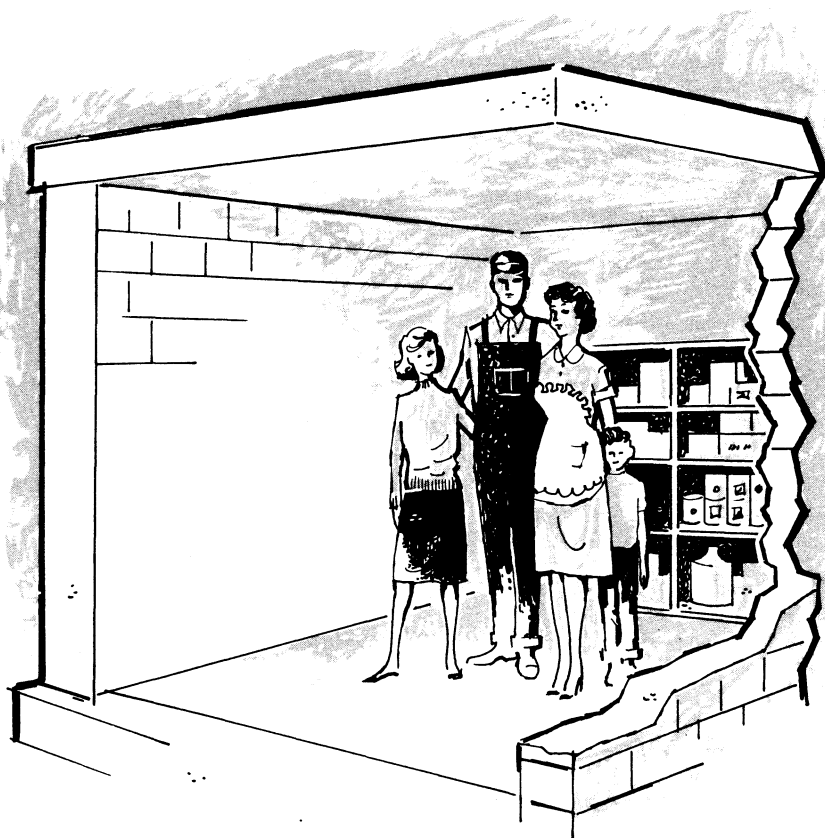
It depends on the extent of the radioactivity.

Leafy vegetables, such as lettuce, should not be eaten unless they are thoroughly washed, or are known to be free of hazardous amounts of radioactive materials.

***What special precautions should be taken for workers in the fields?***

Everyone should remain indoors until the danger from fallout has diminished. When you are told by local officials that it is safe to work outdoors, you may be advised to take precautionary measures against collecting dust on your body. These measures may include the wearing of protective clothing—boots, coat, hat, and gloves.

If you work with livestock, touch them as little as possible; fallout may be on their backs.

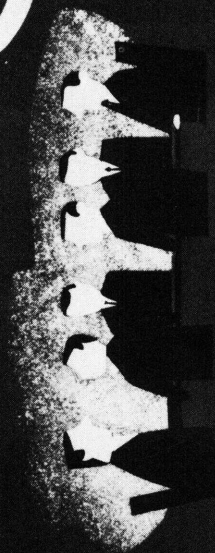


# **AGENCY REPRESENTATIVES ON USDA STATE & COUNTY DEFENSE BOARDS**

**USDA NAT'L.  
DEFENSE BOARD**

**USDA STATE  
DEFENSE BOARD**  
 ASCS ... Chairman  
 AMS  
 ARS  
 CES  
 FHA  
 FS  
 SCS  
 SRS

<b>USDA COUNTY DEFENSE BOARD</b> ASCS ... Chairman CES	} in counties where FHA offices are located
SCS ARS FS *AMS	



**\*Chairman on Metropolitan Defense Boards**

# Emergency Defense Services

By Executive order of the President, the Secretary of Agriculture has put into effect defense services to protect farmers, their families, their livestock, and their agricul-

tural productivity in event of a national emergency. The wide scope of these services enables them to function at all levels—national, State, county, and farm.

## County Defense Boards

In preparing for a national emergency, the farmer may obtain guidance and assistance from his USDA COUNTY DEFENSE BOARD. More than 3,000 of these boards are operating throughout the Nation. The USDA county defense boards receive direction from the USDA State defense boards.

A USDA county defense board is composed of key USDA representatives in the county. The COUNTY OFFICE MANAGER of the Agricultural Stabilization and Conservation Service usually serves as chairman. Other board members may include representatives of the Cooperative Extension Service, the Farmers Home Administration, and the Soil Conservation Service. Representatives of the Forest Service, the Agricultural Research Service, and the Agricultural Marketing Service, where available, are also members of the board.

Each USDA county defense board is equipped to serve the farmer in many ways. The board chairman is responsible for food production programs in most counties. He will see that guidance is available

in emergency farming practices and in conserving farm equipment, fuel, and manpower; he will also help obtain essential services or material.

The Soil Conservation Service member of the board will advise and assist in the proper use of land and water; and the Farmers Home Administration member will help the farmer in credit problems that may arise. The county extension agent will provide education on survival practices and protective measures for the farmer, his family, and his livestock.

The board chairman, or one of the board members, will advise farmers regarding *other programs of USDA agencies that are not represented on the board*. This might include, for example, assistance in the protection of livestock and crops against biological warfare, or rural fire defense. Generally, the board chairman is responsible for USDA programs relating to food processing, storage, and distribution.

The USDA county defense boards will work closely with and support duly constituted county civil government authorities. Farmers

can look to their local county civil defense officials as well as USDA

county defense boards for guidance in national emergency programs.

## **Radiological Monitoring**

To combat successfully the effects of radioactive fallout, it would first be necessary to monitor the radiation to determine the levels of radiation present. This would include identifying the type of radiation, and measuring its intensity. Expert personnel and special instruments are required for this work.

Under the direction of the USDA State and county defense boards, an emergency radiological monitoring program is set up to function immediately, if needed. All Department monitoring activities will be closely coordinated with activities of State

and local governments. One or more USDA monitoring stations are established in each county in the United States.

Trained monitors are ready to aid in handling the radiological problems that would exist following a nuclear attack. Examples of these problems are the detection and measurement of radiological contamination of farmlands, harvestable crops, stored crops, forest land, and water, and the protection and handling of farm animals.

Each USDA monitoring station will report to its USDA county de-



fense board, and the board will record the information and make it available to local civil defense officials.

Monitoring services would be needed immediately after a nuclear disaster to determine the intensity of radiation on the farm. They would be needed later to determine

when radiation has decreased to a point where farming could be safely resumed.

A farmer who has a question about the detection of harmful radiation should contact his local civil defense official or the chairman of his USDA county defense board.

## Rural Fire Defense

Disastrous fires could follow a nuclear attack. To fight them effectively, a CIVILIAN RURAL FIRE DEFENSE has been established under the overall leadership of the U.S. Department of Agriculture, through its Forest Service. This agency is responsible for directing and coordinating the fire defense at the national level.

The USDA program of fire protection on wild and rural lands provides leadership and guidance to the States. This involves about 92 percent of the Nation's land area. In carrying out this program the Forest Service relies heavily on the cooperation of State and private agencies and other Federal agencies that have rural fire protection capability.

The State Governors are responsible for rural fire defense on State and private lands. Through their organizations, which include State civil defense and State rural fire defense, the Governors will assist local fire-defense agencies in planning, organizing, equipping, and coordinating fire-defense activities.

Effectiveness of national and State fire-defense organizations depends on volunteers. These organizations can function more effectively if rural volunteer groups are trained and prepared. Individual preparations serve a dual purpose. For example: A fire lane around a farm forest or grain field both protects the owner's property in peace and emergency and contributes to the local fire-defense effort.

In the American tradition, it is important that neighbors be prepared to help each other. Every farmer and rural resident should know (1) the basic rules of fire prevention, and how to apply them; (2) how to report fires; (3) how to extinguish small fires; and (4) how best to assist fire-protection organization.



If you are in need of fire-defense information, consult your State forester or local official in charge of

rural fire defense; or consult the chairman of your county defense board.

## *More Pointers on Protection*

### **What you can do now . . .**

- Build a family fallout shelter, or pick the safest place in or around your house and add protection to it. Maintain a 2-week emergency supply of food and water in or near your shelter or protection area. . . . Obtain a disaster first aid kit and store it in your protection area. . . . Obtain a battery radio and an outside aerial to be used in your protection area during emergency. . . . Obtain a radiation-detection instrument.

- Plan an additional emergency water supply and a sewage disposal method for your home protection area that do not depend on outside electric power. Remember, a spring or deep well may be useless if the pump depends on public power supplies.

- Prepare an evacuation kit for your automobile with food, water, first aid kit, battery radio, and blankets.

### **If you have a few hours' warning . . .**

- Make arrangements for the safety of your family and yourself.

- Confine all livestock, preferably to buildings, or at least in drylot.

- Bring feed into buildings, or cover it with tarpaulins if it is left outdoors.

- Store as much water as possible for livestock, especially if the water is coming from ponds or streams or through water mains. Cover wells, rainbarrels, and tanks.

- Place decontamination equipment—broom, hose, sprayer, and tractor with scraper or plow—where it will be handy for use when you emerge from the protection area.

### **If you have a few months' warning . . .**

If civil defense authorities are able to give the public a few months' warning that a nuclear attack is likely, here are some things you can do:

- Put your silage pits and haystacks near buildings and cover them with tarpaulins.

- Keep your well clean and covered. Put some rainwater barrels and other containers near buildings; fill them regularly with clean water and keep them covered.

- Store seed and grain in weatherproof buildings.

- Stock up on packaged, canned, and bottled foods.

- Have a satisfactory storage space for fuel, and maintain an emergency supply.

- Make sure that you have a place to confine livestock and poultry, preferably a place that has an overhead cover.

### **During and after fallout . . .**

- *Remain indoors until you are told by civil defense authorities that the danger from fallout can be tolerated.*

- Wash hands and face and change clothing if you have been exposed to high concentrations of fallout.

- Use packaged, canned, and bottled foods, as well as food protected by storage and refrigeration; they are least likely to be contaminated. If it becomes necessary to use other foods, the following information should be helpful:

*Milk*—Safe to use if cows have not been exposed to fallout. May be safe to use if cows have been exposed to fallout but are being fed uncontaminated feed.

*Eggs*—Safe to use even if poultry have been exposed to small amounts of fallout.

*Potatoes and root crops*—Safe to use if they are washed and peeled.

*Green vegetables*—Choose garden vegetables with solid hearts—cabbage, lettuce, etc. Before eating, remove several layers of the outer leaves, and wash thoroughly. Wear rubber gloves when removing the outer leaves.

*Peas and beans*—Only the pods would be contaminated; the peas and beans are safe to use. Wash pods thoroughly before you remove them.

- Wash hands thoroughly before you eat.

- Wear protective clothing—hat, coat, boots, gloves—the first few days you work outdoors. If you are plowing or cultivating dry land, or if you are harvesting corn, wear a dust filter over your nose and mouth; even a handkerchief will be of some value.



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The U.S. Department of Agriculture has produced two motion picture films on defense and radioactive fallout:

“Fallout and Agriculture” (16 mm., sound, color, 23 minutes).

“The Safest Place” (16 mm., sound, color, 13½ minutes).

The Office of Civil Defense has produced the following film:

“About Fallout” (16 mm., sound, color, 24 minutes).

These films are available for loan from the film library of your State land-grant college. For the address of the land-grant college in your State, write to Motion Picture Service, Office of Information, U.S. Department of Agriculture, Washington, D.C., 20250.

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